

DOCUMENT RESUME

ED 067 389

SP 005 884

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 TITLE The Use of Film-Mediated Modeling and Feedback to Change a Teacher's Classroom Responses.
 INSTITUTION Stanford Univ., Calif. Stanford Center for Research and Development in Teaching.
 SPONS AGENCY Office of Education (DHEW), Washington, D.C.
 REPORT NO RD-91
 BUREAU NO BR-5-0252
 PUB DATE Aug 72
 CONTRACT OEC-6-10-078
 NOTE 19p.

EDRS PRICE MF-\$0.65 HC-\$3.29
 DESCRIPTORS *Classroom Communication; *Feedback; Learning Theories; *Reinforcement; *Student Teacher Relationship; *Teacher Education; Verbal Communication

ABSTRACT

The study investigates some of the procedures involved in training teachers to use their verbal attention (to students) on a contingent basis. The results suggest that a combination of modeling and feedback can increase a teacher's positive responses to students. Both film-mediated modeling and feedback of performance were used to change one teacher's behavior in his classroom. The relative contributions of each of the techniques in increasing the teacher's positive statements and decreasing the negative ones were measured using a multiple baseline design. The modeling treatment produced changes in the desired direction, but a trend analysis indicated that the new behavior was not maintained. Feedback of performance served either to maintain or to accelerate changes in the desired direction. The results suggest that proper scheduling of feedback would lead to better maintenance of new patterns of behavior. Consistent with observational learning theory, modeling stimuli can promote initial change, but sustained performance requires systematic reinforcement. (Author)

ED 067389

STANFORD CENTER
FOR RESEARCH AND DEVELOPMENT
IN TEACHING

Research and Development Memorandum No. 91

THE USE OF FILM-MEDIATED MODELING AND
FEEDBACK TO CHANGE A TEACHER'S CLASSROOM
RESPONSES

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August 1972

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and Development in Teaching, supported in part
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Introductory Statement

The Center's mission is to improve teaching in American schools. Too many teachers still employ a didactic style aimed at filling passive students with facts. The teacher's environment often prevents him from changing his style, and may indeed drive him out of the profession. And the children of the poor typically suffer from the worst teaching.

The Center uses the resources of the behavioral sciences in pursuing its objectives. Drawing primarily upon psychology and sociology, but also upon other behavioral science disciplines, the Center has formulated programs of research, development, demonstration, and dissemination in three areas. Program 1, Teaching Effectiveness, is now developing a Model Teacher Training System that can be used to train both beginning and experienced teachers in effective teaching skills. Program 2, the Environment for Teaching, is developing models of school organization and ways of evaluating teachers that will encourage teachers to become more professional and more committed. Program 3, Teaching Students from Low-Income Areas, is developing materials and procedures for motivating both students and teachers in low-income schools.

This study, as a part of the Teaching Effectiveness program, investigated the consequences of social modeling and feedback of performance with regard to a teacher's behavior in the classroom.

Abstract

The study investigates some of the procedures involved in training teachers to use their verbal attention (to students) on a contingent basis. The results suggest that a combination of modeling and feedback can increase a teacher's positive responses to students. Film-mediated modeling and feedback of performance were both used to change one teacher's behavior in his classroom. The relative contributions of each of the techniques in increasing the teacher's positive statements and decreasing the negative ones were measured using a multiple baseline design. The modeling treatment produced changes in the desired direction, but a trend analysis indicated that the new behavior was not maintained. Feedback of performance served either to maintain or to accelerate changes in the desired direction. The results suggest that proper scheduling of feedback would lead to better maintenance of new patterns of behavior. Consistent with observational learning theory, modeling stimuli can promote initial change, but sustained performance requires systematic reinforcement.

THE USE OF FILM-MEDIATED MODELING AND FEEDBACK
TO CHANGE A TEACHER'S CLASSROOM RESPONSES

T. Alper, C. E. Thoresen, and J. Wright

Silberman (1970), one of many commentators on the current educational scene, has criticized teachers because of the inordinate amount of time they spend disciplining students. He cites numerous studies which suggest that the teacher often spends more time in disciplinary activities than in instruction. Further, such discipline typically involves the use of punishment and other negative control methods. Behavioral researchers have been concerned with helping teachers and administrators use more positive and thus more effective approaches to classroom management (e.g., Becker, in press). Simply advising teachers to be more positive and to "open up" the classroom seldom permits them to both take more positive action and maintain effective control of students. Madsen (1970), for example, points out that teachers ordinarily use a high ratio of negative responses to positive ones with students. He argues that if a positive task-oriented classroom environment is to be fostered, a ratio of four contingent positive statements to every one negative statement should be maintained. Data obtained in previous experimental work (e.g., Hall, Lund, & Jackson, 1968; Hall, Panyon, Raben, & Broden, 1968; McAllister, Stachowiak, Baer, & Conderman, 1969; Madsen, 1970; Madsen, Becker, & Armstrong, 1968; Thomas, Becker, & Armstrong, 1968; Ward & Baker, 1968) have demonstrated that making teacher attention contingent upon appropriate student behavior has powerful effects in increasing that behavior. Studies have also indicated (e.g., Madsen, 1970) that teacher attention made contingent upon negative student behavior can also serve to increase negative responses.

The aforementioned studies, although finding significant relationships between teacher attention and student behavior, have generally not provided a precise description and evaluation of the teacher-training programs used. Combinations of verbal instructions, positive comments, feedback from observations, and social models have typically been employed; the specific contributions of each of these components in changing a teacher's positive and negative responses, however, have not been assessed. The present study is an attempt to investigate some of the procedures involved in training teachers to use their verbal attention on a contingent basis. The following questions were examined:

1. What are the effects of film-mediated modeling in increasing a teacher's positive attention?
2. What are the effects of film-mediated modeling in decreasing a teacher's negative attention?

3. What are the effects of feedback (from observers) in providing for either maintenance or acceleration of the changes produced by the modeling intervention?
4. What are the combined effects of modeling plus feedback in producing changes in a teacher's behavior?

Method

Subject and Setting

The subject was a male Caucasian first-year fifth-grade teacher with previous secondary-school experience, who volunteered for the study. The teacher was interested in dealing effectively with inappropriate classroom behavior. The teacher selected three students as targets for observation of student behavior; they were the most disruptive students in his classroom.

The school, located in a predominantly black district, was eligible for Title I anti-poverty funding. The class was made up of 30 students, and all academic instruction was administered by the subject in the classroom.

Design and Procedures

A multiple baseline design was used to test the effects of the interventions in this experiment (Hall et al., 1970; Thoresen, 1972). Baseline measurements were taken on the two target teacher behaviors and concurrent student behaviors. Intervention procedures were applied to one of the target behaviors (attending to inappropriate student behavior) until a change was demonstrated, and then to the other (attending to appropriate student behavior). Figure 1 shows the sequence of treatments in this experiment.

Teacher Negative response (attending to inappropriate behavior)	Baseline (6 days)	Modeling One (5 days)	Feedback One (4 days)	After phase (6 days)	
Teacher Positive response (attending to appropriate behavior)	Baseline (11 days)		Modeling Two (4 days)	Feedback Two (4 days)	After phase (2 days)

Fig. 1. Treatment sequence.

Baseline. To establish the baseline for the first treatment sequence, an observer was present in the classroom for 30 minutes during the math period and 30 minutes during the reading period for six consecutive days. For the second treatment sequence, an observer was present for eleven days. The teacher and students were not informed of the specific purpose of this observation: the teacher was told the observation was being made to determine which behaviors needed attention; the students were told that the observers were student teachers learning about classroom teaching. Classroom observations continued during all phases of the study.

Modeling One: Ignoring inappropriate behavior. On the seventh day, the teacher viewed a video modeling tape of the senior author instructing students in a classroom setting. The modeling tape was 15 minutes long and was shown once. Prior to viewing the tape the teacher was told about its general content and was given cues to attend to specific model behaviors. (For example, "During the tape presentation, specific instances in which the model ignored inappropriate student behaviors are pointed out to the teacher and reviewed.") The effects of ignoring inappropriate student behaviors (the behaviors to be decelerated) were also shown and described. Following this presentation, instructions were given to the teacher to ignore all instances of inappropriate behavior in the following week. The teacher was also advised that the initial effect of the ignoring might be an increase in such behavior but that the long-term effect would be its reduction. This modeling phase lasted five days.

Feedback One: Inappropriate behavior and disapproval. Starting on the twelfth day, the teacher was presented daily with a slip of paper noting the percentage of ten-second intervals in which he had simply attended to inappropriate behavior or had shown disapproval. The observers would compute this percentage immediately following the observation period. This phase lasted four days.

Modeling Two: Attending to appropriate behavior. On the twelfth day (the beginning of Feedback One) the teacher viewed a second 15-minute videotape model of a teacher instructing students in a classroom setting. Again, prior to watching the tape, the teacher was told about the model and given cues to look for. Following the showing of the model, instructions were given to the teacher to attend positively (verbally or nonverbally) to as many instances of appropriate student behavior as possible in the ensuing week. This phase continued for four days.

Feedback Two: Appropriate behavior and positive response. Beginning on the sixteenth day, a slip of paper was presented daily containing the percentage of ten-second intervals in which attention was given to appropriate student behavior. The observers computed this percentage immediately following the observation period and gave it to the teacher the same day. Feedback One, on inappropriate behavior, was discontinued at this time.

After phase. The after phase for attending to inappropriate behavior started on the sixteenth day. During this time only classroom observations continued. The feedback on attending to positive responses was discontinued at the end of the nineteenth day. Two days of observation followed.

The Instruments

Figure 2 is a copy of the time-rule checklist used by the observers to code both teacher and student behavior. The categories were chosen from those used by the authors in a previous research project (Thoresen, Alper, Hannum, Barrick, & Jacks, 1970) and from a home observation system developed by Patterson, Ray, and Shaw (1968). Definitions of the categories follow the figure.

Behavior Coding Sheet											
Name _____						Date _____					
Observer _____				Time _____		Sheet No. _____					
Student Only						Teacher and Student					
AT Attention						DS Destructiveness					
NA Non-Attention						HU Humiliate					
OS Out of Seat						NE Negativism					
TO Talk Out						PN Negative Physical Contact					
Teacher Only						TE Tease					
						DI Disapproval					
SM Smile											
AP Approval											

	AT	NA	OS	TO	SM	AP	DS	HU	NE	PN	TE	DI
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
Total												

Fig. 2. Time-rule checklist.

Observation Categories

- OS Student was out of his seat without permission.
- TO Student talked when the teacher was talking to another student or lecturing, or student was talking to another student when he was supposed to be working.
- SM The teacher smiled.
- AP The teacher gave verbal or gestural approval of the student's behavior.
- DS The person, teacher or student, destroyed, damaged, or attempted to damage any object.
- HU The person, teacher or student, made fun of, shamed, or embarrassed another person intentionally.
- NE The person, teacher or student, made a statement in which the verbal message was neutral, but the tone of voice in which it was delivered conveyed the attitude of "Don't bug me!"
- PN The person, teacher or student, physically attacked or attempted to attack another person with the intent to inflict pain.
- TE The person, teacher or student, teased another person in such a way that the other person was likely to show displeasure or disapproval.
- DI The person, teacher or student, gave verbal or gestural disapproval of another person's behavior or characteristics.

The two observers were trained prior to placement in the classroom and achieved at least a 70 percent level of inter-rater agreement (range 71-80 percent) on all checklist items during the study. The observers used a battery-operated auditory timer set at ten-second intervals to pace their observations.¹ At the beginning of each ten-second interval a buzz occurred, audible only to the observer by means of an unobtrusive earplug, which served as the cue to switch to the next line on the checklist.

The observers were present for one hour daily, 30 minutes during math and 30 minutes during reading. Each observer was assigned to a target student for a five-minute period in each class, coding both the teacher's interactions with that student and his comments to the class in general.

¹Information on this portable observer pacer is available from the senior author.

Following this five-minute period, the observer switched to the next target student. The total time each of the students was observed was 20 minutes per day.

At the end of the observation day, the percentage of ten-second observation periods in which each target behavior occurred was obtained by the following formula:

$$\text{Percentage of intervals observed} = \frac{\text{Frequency of occurrence}}{\text{Number of intervals observed}}$$

These data were charted on two-cycle logarithmic chart paper, since logarithmic charts allow the best estimate of proportional changes in both low- and high-rate behaviors. Mean percentages were computed for each treatment (modeling and feedback) period, and a median slope method was applied to test for significant changes in slope between phases.

Data Analysis

Only teacher responses are reported here. These were divided into two categories: Teacher Negative and Teacher Positive. Teacher Negative is the sum of the percentages of the negative comments made to the target students and to the class in general. Teacher Positive is the sum of the percentages of positive statements made to the target students and the class in general. For example, Teacher Negative for Day 2 totaled 11 percent of the teacher's behavior during the time observed: .3 percent negative responses to the particular students being observed and 10.7 percent negative responses to the whole class.

The split-middle procedure (White, 1971), a median-based regression technique, was applied to analyze the results of the interventions. This technique was chosen because it permits the plotting of a nonparametric line-of-best-fit to determine whether a significant shift between phases has occurred. In this way the results of the interventions can be compared in terms of both static changes (mean) and relative accelerations or decelerations of the data between treatment phases. Typically, visual inspections are used to determine whether significant changes occur in same-subject intensive designs. We were concerned, however, with examining the typical or average performance within each phase as well as the pattern of the data, within and between directions of change.

Results

Tables 1 and 2 and Figures 3 and 4 present the effects of treatment on inappropriate Teacher Negative responses and appropriate Teacher Positive responses. The modeling treatment produced changes in the desired directions in both positive and negative responding. Teacher Negative responding decreased from 7.5 percent to 4.8 percent, a 36 percent reduction from the baseline level. Teacher Positive responding increased from .48 percent to 2.75 percent, a fourfold increase over the baseline.

TABLE 1
Change in Teacher Negative Responses

Treatment period	Mean percentage	Times change	Percentage of change from baseline
Baseline	7.50		
Modeling One (ignoring inappropriate behavior)	4.80	$\div 1.56^a$	-36
Feedback One	3.07	$\div 2.44$	-59
After phase	5.47	$\div 1.37$	-27

^aFor example, there was a 1.56 times decrease in negative response following the modeling treatment compared to the baseline period. This is computed by dividing the baseline period mean by the modeling period mean. Stated differently, the mean negative response rate during the modeling period was 36 percent lower than during the baseline period. This is computed by dividing the amount of change (i.e., the difference between the baseline and Modeling One means) by the mean response rate for the baseline period.

The $\div$ represents a decrease in the behavior relative to baseline.

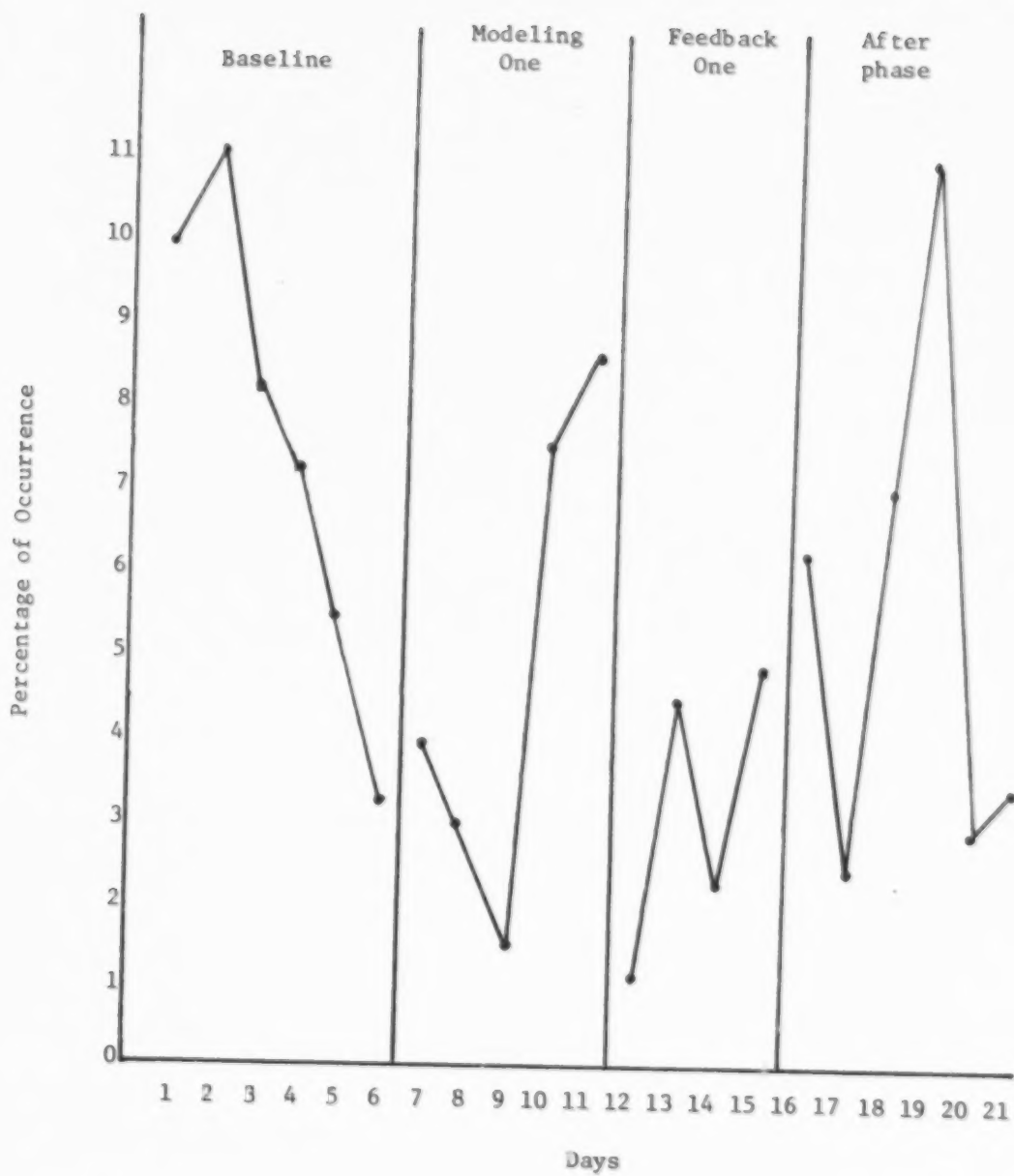


Fig. 3. Teacher Negative responses.

TABLE 2
Change in Teacher Positive Responses

Treatment period	Mean percentage	Times change	Percentage of change from baseline
Baseline	.48		
Modeling Two (positive response to appropriate behavior)	2.75	x5.73 ^a	+452
Feedback Two	3.63	x7.56	+656
After phase	1.65	x3.23	+244

^aFor example, there was a 5.73 times increase in positive responding following the modeling treatment compared to the baseline period. This is computed by dividing the baseline period mean (.48) into the modeling period mean (2.75), i.e., $2.75/.48 = 5.73$. Stated differently, the mean Teacher Positive response rate during the modeling period was 452 percent higher than during the baseline period. This is computed by dividing the amount of change (i.e., the difference between the baseline and Modeling Two means) by the mean response rate for the baseline period.

The x represents an increase in the behavior relative to baseline.

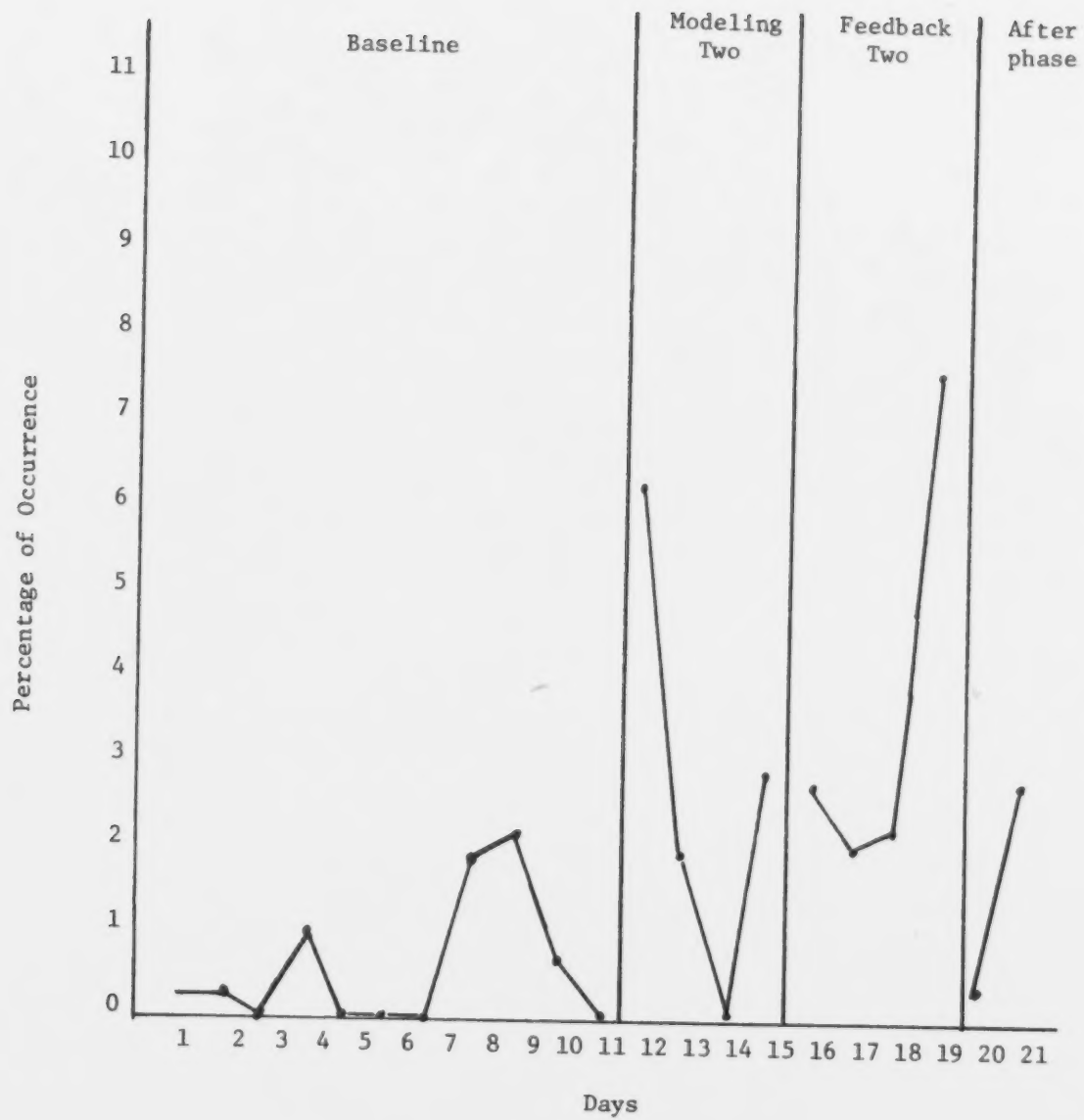


Fig. 4. Teacher Positive responses.

The feedback treatment served to accentuate the previous changes in both positive and negative responding. Teacher Negative responding was lowered to 3.07 percent, a 59 percent reduction from the baseline level. Teacher Positive responding increased to 3.63 percent, a sixfold increase over baseline.

Maintenance of the changes in the after period was only partially successful. Teacher Negative responding remained below its baseline level at 5.47 percent, a 27 percent reduction, and Teacher Positive responding remained above the baseline level at 1.65 percent, a 244 percent increase. But in both cases the percentages maintained were lower than during either treatment period, i.e., there was some reversion to former behavior patterns.

The discussion in this section has dealt with static measures of performance changes in the depending variables, but static analysis of data can be misleading because the trend of effects within each phase is obscured. Interpretation of between-phase changes is helped by examining the slopes of each phase.

The split-middle analyses (Tables 4 and 5) suggest that the effects of the modeling treatment would not have been maintained even if the treatment had been continued. The data trend for Teacher Negative responding was accelerating ($\times 2.86$) and the trend for Teacher Positive responding was decelerating ($\div 2.73$) during the modeling treatment phase. Though the mean percentages for both behaviors were in the desired direction, the slopes indicate a progression toward baseline levels. Inspection of Figures 3 and 4 indicate that the Modeling One or ignoring treatment might have initially influenced the frequency of Teacher Positive responses as suggested by the increases on Days 8 and 9. This trend, however, was not maintained, as is indicated by Days 10 and 11.

Feedback served to produce changes that would have been either maintained or increased in magnitude, given a continuance of treatment. Figures 3 and 4 show that the Teacher Negative slope during feedback was maintaining ($\times 1.01$) and the Teacher Positive slope was accelerating ($\times 2.00$).

Discussion

Our findings suggest the following conclusions:

1. Film-mediated modeling produced increases in the teacher's attention to appropriate student behavior and decreases in attention to inappropriate behavior.
2. The trend or slope of these changes during the modeling treatment was not stable.
3. The feedback of observations to the teacher served either to maintain or to accelerate the level of performance of the desired behaviors.

TABLE 4

Split-Middle Analysis of Teacher Negative Responses

Treatment period	Median percentage	Split-middle slope
Baseline	7.75	÷1.85
Modeling One (ignoring)	3.8	x2.86
Feedback One	3.30	x1.01
After phase	4.80	÷1.85

Note: x indicates a trend in the data that is accelerating. An x2.00 slope would mean that if the median percentage for Week One was 1, then the median percentage for Week Two would be 2. ÷ indicates a trend in the data that is decelerating. A ÷2.00 slope would mean that if the median percentage for Week One was 2, the median percentage for Week Two would be 1.

TABLE 5

Split-Middle Analysis of Teacher Positive Responses

Treatment period	Median percentage	Split-middle slope
Baseline	.30	x1.48
Modeling Two (positive response)	2.4	÷2.73
Feedback Two	2.5	x2.00
After phase	1.65	

4. Maintenance of changes after treatment probably requires a systematic feedback procedure.
5. Modeling treatments should be supplemented with systematic feedback, providing the teacher with data about his performance.

The finding that modeling intervention alone did not produce lasting changes was not surprising. The data indicated that modeling produced initial changes in the target behaviors, but the trends of the data were not in the desired directions. Bandura (1969) has indicated that modeling stimuli assist the learner in making discriminations. These discriminations produce a change in response capability, but the actual performance of responses is determined primarily by environmental contingencies. The teacher's overall rate of positive responding did increase during modeling intervention by a factor of 7.56 times, as compared to baseline. The total level of response, however, was still only 3 out of 100 observed intervals. In order to produce major changes in classroom environment or "atmosphere," a much larger percentage of contingent positive teacher responses is needed. The number necessary may be similar to that found necessary for families: seven positive interactions in a 30-minute period (Stuart, 1970).

The feedback treatment apparently functioned as a reinforcement. The knowledge of his results each day offered a reinforcing stimulus to the teacher, i.e., the behavior involved was maintained or increased contingent upon feedback data. Previous researchers (Cooper, Thomson, & Buer, 1970; Hall, Panyon, Raben, & Broden, 1968) produced significant changes in teacher behavior by using a combination of feedback and instructions. Future research comparing the effectiveness of modeling combined with feedback versus instructions combined with feedback seems warranted.

In the present study, the data for the after phase, although only a short period of time, indicated a change in the target behaviors back toward the baseline level. This finding can be explained partially by the fact that the feedback condition was presented regularly and then withdrawn totally. As has been found in many laboratory studies (e.g., Morse, 1966) a switch from continuous reinforcement to a total lack of reinforcement typically produces rapid extinction of the desired behavior. Gradual alteration of the feedback schedule from continuous to intermittent might lead to more lasting changes. Without such scheduling treatment, any gains would be transitory.

Future investigations on the effectiveness of modeling approaches with teachers should also take into account some variables left untested in the present study. Presentation of models demonstrating a gradual mastery of the response to be learned ("coping") rather than models who have already acquired the skill ("mastery"), as used in this study, might lead to larger increments (Meichenbaum, 1971). Several presentations of modeling during treatment could also serve to produce greater changes in the desired direction. For example, several brief films of different teachers demonstrating the desired responses, used over several

days, might increase the impact of the modeling treatment. Other factors, such as specific model-subject characteristics (age, sex, physical appearance, etc.), should be explored along with the effects of vicarious reinforcement. (See Thoresen & Stuhr, 1972.) Bandura (1971) has offered evidence that the use of an actual "live" model coupled with immediate guided practice following observation, along with selective reinforcement, is a very powerful combination for changing behavior.

This investigation has suggested that modeling-based interventions can stimulate changes in a teacher's classroom behavior. Modeling alone, however, seems not to be effective in producing lasting results. The findings of this study indicate that it is highly desirable to use systematic feedback or practice in conjunction with social modeling. Together, modeling and feedback may be used to increase a teacher's positive responses to students.

At present the system of trial and error typically prevails in the preparation and training of teachers. If a remedy to the "crisis in the classroom" (Silberman, 1970) is to be found, a more scientific approach to teacher training is needed (McDonald, in press). Behavior-oriented strategies appear highly promising in providing training techniques. The combined use of social modeling with contingent reinforcing events appears to deserve considerable attention in the search for improvement of teaching and teacher training.

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